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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS

Sub-Committee of Experts on the Transport of Dangerous Goods

REPORT OF THE SUB-COMMITTEE OF EXPERTS ON ITS TWELFTH SESSION
(Geneva, 1-12 July 1996)

Addendum 3

Annexes 6 and 7

REPORTS OF THE WORKING GROUPS ON THE HARMONIZATION OF CLASSIFICATION CRITERIA
(see ST/SG/AC.10/C.3/24, paras. 148 to 157)

Annex 6 - Report of the Working Group on Harmonization of Classification Criteria for Reactive Substances

Annex 7 - Report of the Working Group on Harmonization of Classification Criteria for Flammable Substances

Note by the secretariat: These working groups were convened in the context of cooperation with the International Labour Office (ILO), the Inter-Organization Programme on Sound Management of Chemicals (IOMC) and follow-up to the United Nations Conference on Environment and Development (UNCED) (Agenda 21, Chapter 19, Programme Area B).

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ANNEX 6

Report of the Working Group on Harmonization of Classification Criteria for Reactive Subetances on its third session

GENERAL

1. The Working Group reconvened for the third time on 9 July 1996 during the twelfth session of the Sub-Committee on the Transport of Dangerous Goods (1-12 July 1996). Mr. R. Woodward (United Kingdom) served as chairman and Mr. I. Obadia (ILO) as rapporteur. Experts were asked to review document ST/SG/AC.10/C.3/R.610/Rev.2, as presented by the United Kingdom and in the light of new related documents and informal documents prepared to answer a number of issues raised during the second session of the Group in December 1995 (see ST/SG/AC.10/C.3/22/Add.2).

2. During its one day session, the Working Group could complete discussion of only portions of Parts 1, 2 and 3 of document ST/SG/AC.10/C.3/R.610/Rev.2., including new related documents and informal documents presented by the experts. Although discussion on how to finalize the report to ILO on the status of Group's progress on harmonization of physical hazard took place at different times during the session, debate on the subject is reported in paragraphs 15 and 16 at the end of this report so as to ensure its coherence.

PART 1: EXPLOSIVE SUBSTANCES

Definitions, tests, and classification

Documents: ST/SG/AC.10/C.3/R.748 (Germany)

Informal documents: INF. 16 (Germany)
INF. 34 (Germany)

3. The expert from Germany introduced document ST/SG/AC.10/C.3/R.748, and noted that a missing annex was provided in INF.16. Informal document INF.34 was a proposed amended version of Part 1 of ST/SG/AC.10/C.3/R.610/Rev.2 incorporating the changes proposed in ST/SG/AC.10/C.3/R.748 and INF.16. These documents had been prepared at the request of the Working Group during its December 1995 session to provide a possible solution to the classification of substances and articles which are explosive by design and substances which have intrinsic explosive properties, so as to take account of the classification requirements for sectors other than transport.

4. A number of experts noted that INF.34 had not been made available in sufficient time for them to evaluate it. Other experts questioned the validity of proposing a new classification scheme which seemed to differ significantly from the current system in the Recommendations on the Transport of Dangerous Goods. In order to solve the procedural questions raised and possible misunderstanding of the purpose of the two documents, the discussion on explosives was postponed to the afternoon session and an informal discussion led by the chairman of the Working Group to clarify the German proposal, was held during lunch break.

5. In resuming the debate, the Chairman informed the Working Group that a number of misunderstandings arising from ST/SG/AC.10/C.3/R.748 had been cleared during the lunch break meeting . Following an earlier suggestion by the expert from the United States of America, he proposed to pursue the discussion on the basis of document ST/SG/AC.10/C.3/R.610/Rev.2, and to add a footnote to that document to highlight the issue of intentional versus unintentional explosives.

6. After this was agreed, the representative of CEFIC and the expert from Sweden noted that recommendations 9 c) and 9 f) in ST/SG/AC.10/C.3/R.610/Rev.2 were not coherent. The expert from the United States of America proposed that 9 c) could be revised to mention only UN test series 2 and 3 and delete 9 f). The expert from the United Kingdom explained that the two recommendations were needed to reflect the fact that "Explosives" and "explosive properties" are two different issues. The expert from Germany stated that the classification of intentional explosives was not in question but that, especially for purposes other than transport, the issue of substances with explosive properties needed to be resolved and that the recommendations should show a clear separation between the two categories.

7. After further debate, the Working Group finally agreed to revise paragraph 9 c) as follows: "Tests used to determine explosive properties should be harmonized on UN test series 2 and 3 and, where appropriate, test series 1". The Chairman suggested that an explanatory footnote concerning the type of explosives covered by the UN system could be inserted in ST/SG/AC.10/C.3/R.610/Rev.2 with the understanding that the reservations placed by the expert from Canada over the risk of creating additional categories of explosives would be taken into account. No other recommendations in Part 1 of ST/SG/AC.10/C.3/R.610/Rev.2 were discussed. The expert from Canada agreed to convey his reservations in writing to the expert from the United Kingdom by the end of October 1996.

Screening procedures

Document: ST/SG/AC.10/C.3/R.672/Rev.1 (CEFIC)

Informal document: INF.10 (OECD-IGUS)

8. The representative of CEFIC introduced the above documents which contained proposals for screening procedures to determine whether the full classification tests for a harmonized system needed to be carried out. Document INF.10 contained proposals for amendments to the Manual of Tests and Criteria to include the procedure described in ST/SG/AC.10/C.3/R.672/Rev.1. Several experts recognized that the proposals were excellent from a technical point of view. The Chairman and the expert from the United Kingdom noted however that recommendation 11 j) in ST/SG/AC.10/C.3/R.610/Rev.2 stated that, while very useful, the screening procedure should be published as voluntary guidance only. The Working Group could only agree that the proposal in INF.10 was good but that decision on how to publish it or where to insert it should be postponed for the time being.

PART 2: ORGANIC PEROXIDES

Document: ST/SG/AC.10/C.3/R.775 (European Commission)

9. The expert from the United Kingdom noted that no modifications had been made, in ST/SG/AC.10/C.3/R.610/Rev.2, to the text previously presented in ST/SG/AC.10/C.3/R.610/Rev.1. The observer from the European Commission introduced document ST/SG/AC.10/C.3/R.775 describing the criteria for classifying organic peroxides and their basis according to the European Union Council Directive 67/548/EEC concerning the classification, packaging and labelling of dangerous substances. The concern of the European Commission was that an alignment of the harmonized criteria on those of the UN would lower the level of protection. She therefore proposed to have two cut-off points, one for transport and one for use. The chairman noted that the difference between the 0.5% and 1% available oxygen cut-off points under discussion was small and that it should be possible to reach agreement on one harmonized cut-off point.

10. A number of experts supported the two cut-off points approach or a harmonized cut-off at 0.5% while others preferred a 1% cut-off on the basis that the rationale for 0.5% was not convincing, in view of the large number of products such as adhesives and formulations used to replace chlorinated cleaning products that had a peroxide content between 0.5 and 1% which would need to be tested.

11. No consensus position could be reached on the European Commission proposal. It was agreed that this fact would be reflected in the final document on the status of harmonization of physical hazards to be transmitted to ILO and no further discussion on ST/SG/AC.10/C.3/R.775 concerning the cut-off point is necessary for the time being.

PART 3: OXIDIZING SUBSTANCES

Test methods

Document: ST/SG/AC.10/C.3/R.709 (Germany)

Informal document: INF.35 (Germany)

12. The expert from the United Kingdom introduced Part 3 of ST/SG/AC.10/C.3/R.610/Rev.2 and noted that a new paragraph 17 e) dealt with the issue of physical state of substances and testing for the purpose of classification and that paragraph 17 g) had been modified to reflect this problem.

13. The expert from Germany introduced document ST/SG/AC.10/C.3/R.709 on definitions and criteria for oxidizing gases and related document INF.35 on the classification procedure of gases as oxidizing substances. The results of a laboratory evaluation of the test prescribed in ISO 10156, using nitrous oxide (N_2O) as an oxidizing gas, showed that its application had some limitations in providing a reliable coefficient of oxygen equivalency. In particular the results were found to be dependant on the type and form of the plastics material used. The expert from Germany further proposed to use a procedure which is based on the oxygen limiting concentration with ethane as a combustible reference gas. Speaking on behalf of ISO, the expert from France inquired about the way in which the evaluation had been conducted and it was suggested that Germany and ISO get together to elaborate an improved proposal for the testing of oxidizing gases.

14. The chairman noted that, except for the ISO 10156 test, there was no disagreement on the recommendations in Part 3 and that no further work should be considered. However apart from those concerning the test method for oxidizing gases, no other discussions were carried out on Part 3 of ST/SG/AC.10/C.3/R.610/Rev.2.

FINAL STATUS REPORT OF THE WORKING GROUP TO ILO

15. The Chairman introduced a set of tables prepared in Germany as a possible example of format for reporting the final results of the working groups on both reactivity and flammability. He stressed the fact that the data shown in the table were included for illustration purposes only and were not factual. The idea was to extract the relevant recommendations from document ST/SG/AC.10/C.3/R.610/Rev.2 as amended by the Working Group and to insert them in the tables, indicating for each hazard category, the degree of consensus reached or lack of it. The tables should be done by the chairmen of both working groups and commented by members of the working groups by correspondence. A draft set of tables taking into account comments received by correspondence, attached to a introductory text with a summary of the harmonization status for each hazard category should be presented to the Committee in December 1996 for discussion before transmission to the ILO and then to the IFCS meeting in February 1997.

16. The chairman of the Sub-Committee agreed, as he could not see any other way forward. He indicated also that the work should be completed through a correspondence group with a deadline of mid-October */ to allow proper submission of the document to the Committee in December. It was understood that for the parts of ST/SG/AC.10/C.3/R.610/Rev.2 which were not be discussed at this session, the relevant recommendations in ST/SG/AC.10/C.3/R.610/Rev.1 would be reported unless new documents on this part were submitted to the Committee. It was also understood that a third revision of the document would not be produced. The expert from the United States of America stated that ST/SG/AC.10/C.3/R.610/Rev.2 should be used only to develop a list of specific criteria and tests for each hazard category under consideration by the working groups and that a tabular format was acceptable. A number of other experts supported this approach. There was no specific objection from the Working Group to this way forward.

17. The representative from ILO expressed regrets that the Working Group on Harmonization of Classification Criteria for Reactive Substances succeeded only partially in formulating a comprehensive set of harmonized classification criteria for physical hazards. He informed the Sub-Committee that the ILO would probably make a formal request through the IFCS or the Economic and Social Council that the Committee of Experts on the Transport of Dangerous Goods consider continuing this work during the next biennium, as he could not identify any other competent forum for doing this work.

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*/ Note by the secretariat: The deadline for submission of documents to the Committee is 20 September 1996.

ANNEX 7

REPORT OF THE WORKING GROUP ON HARMONIZATION OF CLASSIFICATION CRITERIA FOR FLAMMABLE SUBSTANCES

GENERAL

1. The third session of the Working Group on Harmonization of Classification Criteria for Flammable Substances was held on 10 July 1996 during the twelfth session of the Sub-Committee of Experts on the Transport of Dangerous Goods under the chairmanship of Mr. G. Oberreuter (Germany). Various experts from all delegations participating at the twelfth session of the Sub-Committee attended the meeting.

2. The Working Group worked on the basis of the report on its second session (ST/SG/AC.10/C.3/22/Add.2, Part II), and new submissions.

Document: ST/SG/AC.10/C.3/22/Add.2

3. The Working Group reviewed the tables annexed to Part II of ST/SG/AC.10/C.3/22/Add.2. It was agreed that the references to packing group in the column "Remarks" of the various tables should be deleted as they were relevant for transport only.

CLASSIFICATION CRITERIA FOR FLAMMABLE LIQUIDS

Documents: ST/SG/AC.10/C.3/R.659 and -/C.3/R.721 (section 1) (Argentina)

4. Table 1, concerning test methods and definition of flammable liquids, was confirmed.

5. Documents ST/SG/AC.10/C.3/R.659 and section 1 of document -/C.3/R.721 were withdrawn by the expert from Argentina.

6. It was confirmed that additional criteria used for the carriage of flammable liquids in bulk in oil or chemical tankers (such as auto-ignition temperature) would not be taken into account for the development of an harmonized system.

60 °C flash point cut-off limit

Documents: ST/SG/AC.10/C.3/22/Add.2, annex, table 2
ST/SG/AC.10/C.3/R.745 (CONCAWE)

7. The representative of CONCAWE explained that the adoption of a 60 °C cut-off limit would cause problems to the European oil industry because gas oils, light heating oils and diesel fuels are manufactured to performance specifications which require that flash points exceed 55 °C. Typically they ranged from 55 to 75 °C, and they are produced in very high volumes. A 60 °C flash point cut-off limit would imply the application of different transport and storage regulations to products manufactured to the same specifications. In addition the flash point of such products would have to be tested and checked regularly from batch to batch.

8. Most european delegations and Canada supported the view of CONCAWE that these products (gas oils, light heating oils and diesel fuels) should all be treated in the same manner.

9. It was agreed to retain the flash point cut-off limit of 60 °C. It was also agreed that regulatory bodies could consider special clauses to allocate this group of products to one danger level only.

Upper flash point cut-off limit

Document: ST/SG/AC.10/C.3/R.785 (Japan)

10. The Working Group noted the information provided by the expert from Japan that fires involving substances with a flash point between 70 °C and 200 °C and even above 200 °C had happened and had caused deaths, injuries and considerable property damage. However the proposal to fix no upper flash point cut-off limit was not supported.

11. The Working Group had then to decide on the most appropriate flash point value (90 °C, 93 °C or 100 °C) for the upper cut-off limit.

12. Most delegations considered that there was not a very significant difference of level of safety between the three values, and the choice would depend in fact on the economic impact for the industry.

13. The 100 °C value was used in the past in Europe for inland transport regulations and is still used in certain european countries for storage regulations. However, lowering this value to 93 °C or 90 °C would imply no cost for the european industry.

14. The 93 °C (200 °F) value is used in North America and adopting the 100 °C value would result in important costs for the industry as many substances are manufactured to a specification meeting the just above 93 °C (but less than 100 °C) flash point value.

15. Several delegations supported the 90 °C value, as a round figure would be "politically" more acceptable and that value would not imply any cost either to the European or North American industry. However, as there was no objection to the 93 °C value, this latter value was adopted for the upper flash point cut-off limit.

CLASSIFICATION CRITERIA FOR FLAMMABLE GASES

Document : ST/SG/AC.10/C.3/22/Add.2, annex, Table 4

16. The Working Group agreed that the two levels of danger should be described as "high danger" and "medium danger" and that a low danger level would not be applicable. The high danger level covers gases which are considered as flammable according to the transport regulations, and the medium danger level covers any other flammable gases.

17. It was agreed that the wording of the text in the column "characteristics" for the medium danger should be consistent with that agreed for the high danger (i.e. reference to precise condition of temperature (20 °C and pressure (101.3 kPa)). After considerable discussion, the following text was agreed for the medium danger: "Gases or gas mixtures, other than those of high danger, which, at 20 °C and a standard pressure of 101.3 kPa, have a flammable range in mixture in air", even though the ISO standard 10156 does not make a specific reference to 101.3 kPa.

18. The Working Group noted that ISO published a second edition of ISO Standard 10 156 and that the reference to that standard should be "ISO 10156:1996".

Document: ST/SG/AC.10/C.3/R.730 (Canada)

19. The Working Group reconfirmed (see also ST/SG/AC.10/C.3/22/Add.2, Part II, para. 9) that methyl bromide and ammonia should be considered separately by regulatory systems and that there was no need to refer to these special cases as exemptions in the recommended harmonized classification system.

CLASSIFICATION CRITERIA FOR FLAMMABLE AEROSOLS

Documents: ST/SG/AC.10/C.3/22/Add.2, Part 2, paras. 10 to 18
ST/SG/AC.10/C.3/R.590 (United States of America)
ST/SG/AC.10/C.3/R.721, section 2 (Argentina)
ST/SG/AC.10/C.3/R.764 (United Kingdom)

Informal document: INF.36 (Germany)

20. In presenting ST/SG/AC.10/C.3/R.764, the expert from the United Kingdom first warned the Working Group that there was potential confusion over the term "aerosol", as it was often used to refer to aerosol dispensers even though the term strictly meant a physical state of a suspension of solid or liquid particles in a gas. He emphasized that this part of the Group's work was directed at the flammability of aerosol dispensers. He then distinguished the different flammability hazards which arose

(a) during transport/storage; and
(b) from consumer use;

and considered that these factors are very relevant to the development of harmonised flammability criteria for aerosol dispensers.

21. It was noted that the various definitions of "aerosols" in the UN Recommendations on the Transport of Dangerous Goods, the European Community Directive 75/324/EEC and the ICAO Technical Instructions were broad, as is explained in the annex to ST/SG/AC.10/C.3/R.764. These three definitions could be provisionally left in square brackets pending careful comparison and decision at the Committee session.

22. There were more divergent views as regards the definition of the term "flammable" in the case of aerosols. The EC directive 75/324/EEC as amended by 94/1/EC cover all aerosol dispensers containing any amount of flammable substance unless it can be proved by testing that the aerosol itself is not flammable . The expert from Germany considered that this was the widest definition and should be considered as the basis with possible cut-off levels to be developed. It was noted that within the EU a testing method for proving the non-flammability had not yet been adopted.

23. The definition in the UN Recommendations on the Transport of Dangerous Goods is restricted to aerosol dispensers containing more than 45% by mass, or more than 250 g, of flammable components. The relevance to such quantities was also questioned by some experts due to technicological changes. The expert from Germany questioned whether that definition, referring to quantities, was compatible with the principle of defining hazards according to the intrinsic properties of the substance.

24. Finally, the ICAO Technical Instructions, as an alternative to the UN Recommendations, includes a definition based on a flammability test. Several delegations considered that this performance test as well as the method being developed by the EU should also be taken into account.

25. As regards the possible definition of flammable substances contained in aerosol dispensers, it was left that the definitions and cut-off limits agreed for flammable liquids and gases should be considered.

26. The Working Group agreed to refer the question of definition of aerosols to the Committee. Further work will be needed to develop a suitable performance test and to complement the proposal on harmonised classification criteria for the flammability of aerosols.

Report to the Committee of Experts on the Transport of Dangerous Goods

Informal document: INF.48 (Germany)

27. The Sub-Committee agreed that the outcome of the work of the Working Group on harmonized classification criteria for flammability could be presented to the Committee as proposed by the chairman of the Working Group.

28. The expert from Germany recalled that definitions concerning compressed gases should also be included in the final document to be transmitted to IFCS. The chairman of the Sub-Committee said that this should be done as agreed at the 11th session of the Sub-Committee (see ST/SG/AC.10/C.3/22, para. 199).

Table 1: Testing methods and definitions

Testing methods	
testing methods for flashpoint determination	closed cup methods preferred, open cup methods only acceptable in special cases
(Draft) Definition of flammable liquids	
liquids to gases	vapour pressure at 50 °C > 300 kPa or completely gaseous at 20 °C (at standard pressure of 101.3 kPa)
liquids to solids	melting point ≤ 20 °C at 101.3 kPa or for viscous substances without a defined melting point, tested according to ASTM D 4359-90 or penetrometer as prescribed in Annex A.3 ADR with penetrometer according to ISO 2137:1985

Table 2: (Draft) Hazard levels of the classification of flammable liquids

Level	Uniform hazard description	Characteristics
Very high danger	to be developed	initial boiling point ≤ 35 °C flashpoint < 23 °C
high danger	to be developed	flashpoint < 23 °C, initial boiling point > 35 °C
medium danger	to be developed	flashpoint 23 °C - 60 °C
low danger	to be developed	flashpoint > 60 °C and ≤ 93 °C

Table 3: (Draft) Hazard levels for flammable solids

Level	Uniform hazard description	Criteria
high danger	-	not applicable
medium danger	to be developed	method as described in section 33 of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria screening test: testing time 2 min (20 min for metal powders) burning rate test: time < 45 s or rate > 2 mm/s or ≤ 5 min for metal powders wetted zone does not stop fire
low danger	to be developed	method and test as described before wetted zone stops the fire for at least 4 min burning rate test time more than 5 min and less than 10 min for metal powder

Table 4:(Draft) Hazard levels of the classification of flammable gases

Level	Uniform hazard description	Characteristics
high danger		gases which at 20 °C and a standard pressure of 101.3 kPa (a) are ignitable when in a mixture of 13 % or less by volume in air; or (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Flammability should be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:1996). Where insufficient data are available to use these methods, tests by a comparable method recognized by a national competent authority may be used.
medium danger		gases or gas mixtures, other than those of high danger, which, at 20 °C and a standard pressure of 101.3 kPa have a flammable range in mixture in air.
low danger		not applicable